TAMARACK MILL (PWS 3020035)
SOURCE WATER ASSESSMENT FINAL REPORT

June 20, 2001

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for Tamarack Mill, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Tamarack Mill drinking water system consists of a single well source. The well is capable of producing 300 gpm. The well has a moderate susceptibility to inorganic contaminates (IOCs), volatile organic contamination (VOC), synthetic organic contamination (SOC) and a low risk for microbial contamination. Since 1994 several water sampling events have detected the presence of trace amounts of the IOCs manganese, fluoride, chromium and cyanide. However, these contaminants were detected at levels far below federal and State maximum contaminant levels (MCL).

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For Tamarack Mill, source water protection activities should focus on implementation of practices aimed at protecting the wellhead and surface seal within the zone immediate to the well. Spills and accidents from activities within the jurisdiction of the millsite and Highway 95 should be closely monitored and dealt with. Some of the designated area is outside the direct jurisdiction of the Tamarack Mill. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, local Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR TAMARACK MILL, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The non-transient water system for Tamarack Mill is comprised of a single well that serves approximately 35 people. The well is located within the Tamarack Mill property boundary, approximately 7 miles west-southwest of the community of New Meadows. (Figure 1).

No detections of microbials, VOC or SOC have been detected in the system. Since 1994 several water sampling events detected the presence of trace amounts of the IOCs manganese, fluoride, chromium and cyanide. However, these contaminants were detected at levels far below federal and State maximum contaminant levels (MCLs) and are not considered high risk factor.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Scott Creek – Mann Creek aquifer in the vicinity of Tamarack Mill. The computer model used site specific data, assimilated by DEQ from a variety of sources including the Tamarack Mill well log, other local area well logs, and hydrogeologic reports summarized below.

The Tamarack Mill well takes its water from the fractured basalt of the Columbia River basalt aquifer. Geologic formations associated with basalt of the Columbia Plateau are known to yield as much as several hundred gallons per minute (gpm) (IDWA, 1966). The Columbia River basalts are flood type basalts that are dense, exhibit columnar jointing in many places, and are folded and faulted leading to many fracture zones where ground water may collect. (Whitehead and Parliman, 1979). Basalt flows fracture at the surface as they cool. The fractures occur in the horizontal direction throughout the flow. Regional fractures hundreds or thousands of feet long may intersect several flows and have widely varying widths (Lum et al., 1990). The aquifer thickness ranges from 20 to 800 feet and the transmissivity ranges from 2,700 ft^2/day to 270,000 ft^2/day (Barker, 1979; Cohen and Ralston, 1980). Regional ground water recharge appears to follow the Weiser River valley from north to south.

It is likely that Tamarack Mill well groundwater area of influence over the three, six and ten year time of travel periods is a one or two mile-long roughly oval-shaped area that extends northward up the Weiser River valley. However, because of the limited number of wells in the area, DEQ elected to assign constant head boundaries equally spaced concentrically around the well (Figure 2). The actual data used by DEQ in determining the source water assessment delineation areas are available upon request.

FIGURE 1. Geographic Location of Tamarack Mills

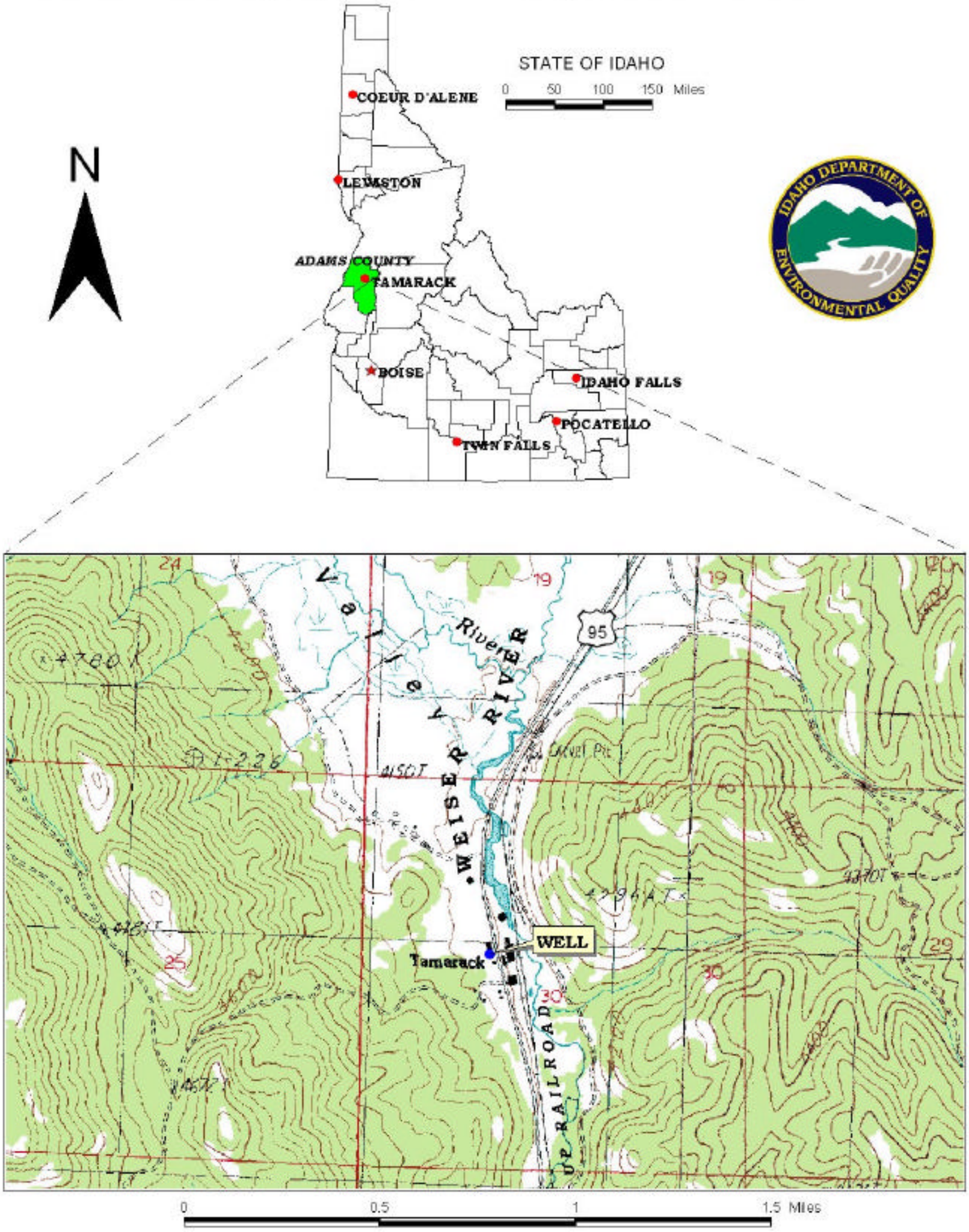
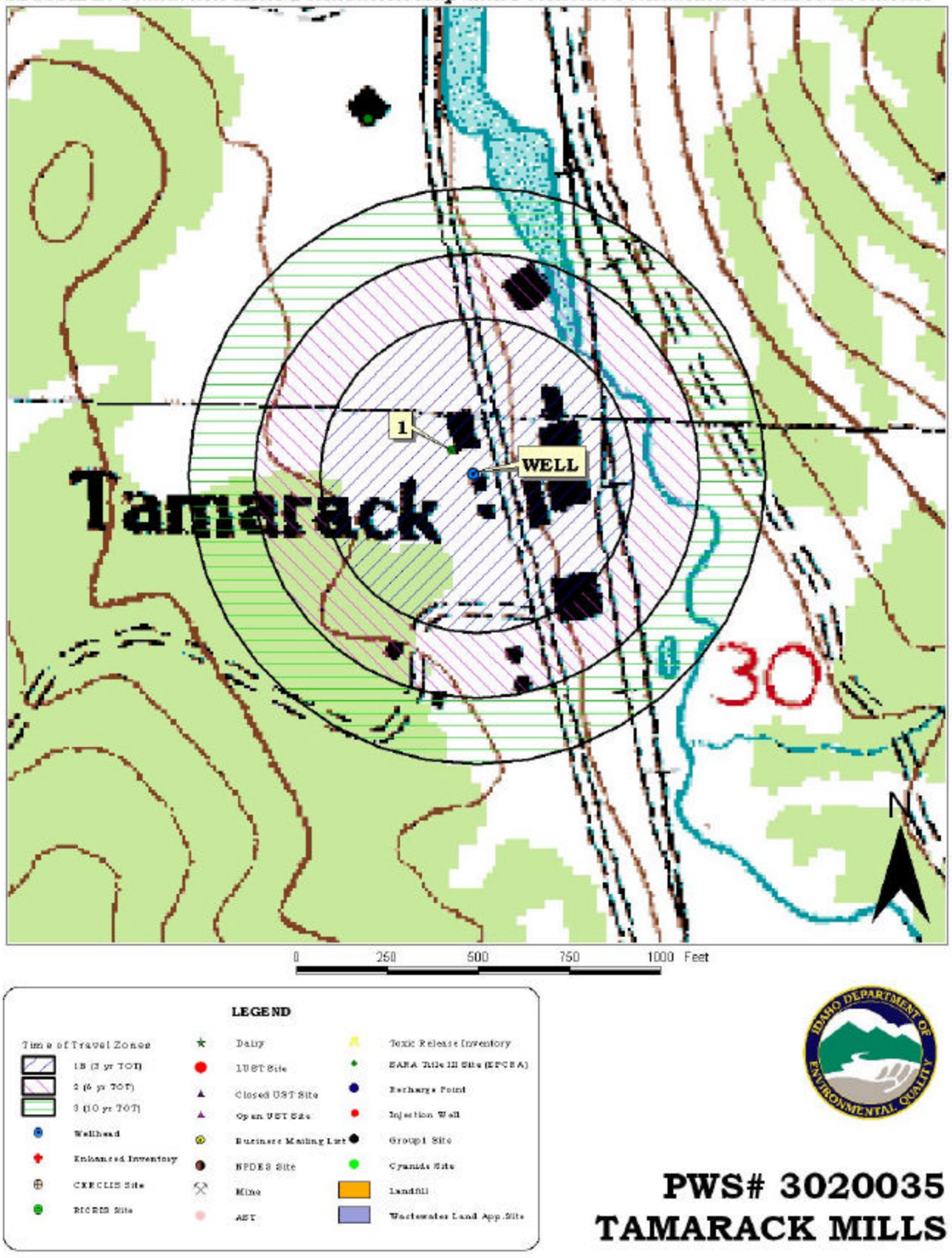


FIGURE 2. Tamarack Mills Delineation Map and Potential Contaminant Source Locations



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TAMARACK MILLS

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside the Tamarack Mill area is recreation, forest and pastureland. Land use within the immediate area of the wellhead consists of the timber millsite and a major highway thoroughfare.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination. These involve educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted from December 2000 to January 2001. The first phase involved identifying and documenting potential contaminant sources within the Tamarack Mill Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Tamarack Mill Manager Gary Bender.

The well is within Tamarack Mill's property boundary. Database research indicates the well has two potential contaminant sites including the millsite with various types of SOC and VOC (solvents, grease and other petrochemicals) potential contaminants on site. Additionally, all three of the delineation areas are crossed by Highway 95 -- a potential source for all types of contaminants (Table 1). Figure 2 shows the locations of these various potential contaminant sites relative to the wellhead.

Table 1. Tamarack Mill Wells #1 and 2, Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Timber Mill	0-3	Database Search	VOC, SOC
2	Highway	0-3, 6,10	Database Search	IOC,VOC, SOC, M

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M = microbials

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristic and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity is moderate for the well (Table 2). This reflects the nature of the soils being in the poorly to moderately well-drained class, the vadose zone (zone from land surface to the water table) being made predominantly of unconsolidated broken basalt sand and gravel, and the first ground water being located less than 300 feet below ground surface. Additionally, the well probably does not have laterally extensive low permeability units that could retard downward movement of contaminants.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The Tamarack Mill well system construction scores at a low risk.

A sanitary survey for the well was completed in December 1994 to determine if the well was in compliance with wellhead and surface seal standards. The well is housed in a 12' X 16' steel building built on a concrete pad. Well casing extends 48 inches above the floor to protect from flooding. The well has a maintained wellhead seal but no casing vent. The well log is available so a determination was made that the casing and annular seal may not be seated in a low permeability unit and the casing does not meet current thickness requirements. Therefore, the current public water system (PWS) construction standards are not being met. The above notwithstanding, the well construction still ranks as low risk.

Well #1 was drilled in 1982 to a depth of 575'. The driller's log has complete geologic data but the depth that groundwater was encountered is not mentioned. The hole is cased from top to 500' below ground surface

(bgs). The static water level was identified at 29 feet with an unspecified water producing zone that could be between 104 and 130 feet bgs. Screened intervals include 26 feet beginning at 104 feet, 10 feet beginning at 200 feet, 10 feet beginning at 269 feet, 17 feet beginning at 480 feet. There is also an uncased/unscreened interval of water between 530 feet to 575 feet bgs. The well log indicates that the annular seal extends to 19 feet and is seated in broken clay and basalt. Upon completion of the well in1982, a well test was run for only 4 hours resulting in a discharge rate of 300 gallons per minute with an undetermined drawdown.

Potential Contaminant Sources and Land Use

In terms of land use the well rated moderate for IOCs, VOCs and SOCs and low for microbials. Industrial land uses (the mill) and the presence of Highway 95 within the delineated source area resulted in this rating.

Final Susceptibility Ranking

A detection above a drinking water standard MCL or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having two potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) including Highway 95 and the millsite, a moderate risk rating for hydrologic sensitivity and a low risk rating for system construction in terms of total susceptibility, the Tamarack Mill well rates moderate for IOC, VOC, SOC and low for microbial contamination (Table 2).

Table 2. Summary of Tamarack Mill Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	M	M	L	L	M	M	M	L

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility, IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

Although the well is not considered to be at high risk for contamination, care needs to be taken to assure its continued good water quality. The wellhead's moderate hydrologic sensitivity indicates that accidental contaminant spills at the millsite or along Highway 95 should be monitored for and dealt with immediately if they occur.

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Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Tamarack Mill, source water protection activities should focus on implementation of practices aimed at protecting the area nearest the well. Tamarack Mill management should also be diligent about vendors that transport potential contaminants to the millsite that are regulated by the various environmental regulations (RCRA, CERCLA, SARA) and other potential inorganic contaminants. Though water quality is generally good for the Tamarack Mill well, the highly fractured nature of the Columbia River basalt could lead to cross-contamination from shallower fractures to deeper fractures depending on well construction. Any surface releases should be monitored closely to prevent contaminants from infiltrating to the ground water producing zones. Due care should be maintained to reduce the risk of microbial contamination. Some of the designated areas are outside the direct jurisdiction of the Tamarack Mill. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, local Soil and Water Conservation District, and the Natural Resources Conservation Service.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office (208) 373-0550

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 343-7001 (mharper@idahoruralwater.com) for assistance with drining water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Barker, R.A., 1979. Computer Simulation and Geohydrology of a Basalt Aquifer System in the Pullman-Moscow Basin, Washington and Idaho. U.S. Geological Survey Water-Supply Bulletin No. 48.

Cohen, P.L. and D.R. Ralston, 1980. Reconnaissance Study of the Russell Basalt Aquifer in the Lewiston Basin of Idaho and Washington. Idaho Water Resources Research Institute, University of Idaho, Moscow, Idaho, 165 p.

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Lum II, W.E., J.L. Smoot, and D.R. Ralston, 1990. Geohydrology and Numerical Model Analysis of Ground-water Flow in the Pullman-Moscow Area, Washington and Idaho.

Whitehead, R.L. and D.J. Parliman, 1979. A Proposed Ground Water Quality Monitoring Network for Idaho. U.S. Geological Survey (prepared in cooperation with Idaho Department of Health and Welfare, Division of Environment), Water Resources Investigations, Open-File Report 79-1477, 67 p.

Attachment A

Tamarack Mill
Susceptibility Analysis
Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report: Public Water System Name: **Tamarack Mill Well** (Formerly Evergreen Forest Products) Public Water System Number 3020035, 4/20/01

1. System Construction			SCORE			
Drill Date		5/27/82				
Driller Log Available		YES				
Sanitary Survey (if yes, indicate date of last survey)		YES	1994			
Well meets IDWR construction standards		NO	1			
Wellhead and surface seal maintained		YES	0			
Casing and annular seal extend to low permeability unit		YES	0			
Highest production 100 feet below static water level		YES	0			
Well located outside the 100 year flood plain		YES	0			
	Total System Construction Score		1			
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained		YES	0			
Vadose zone composed of gravel, fractured rock or unknown		YES	1			
Depth to first water > 300 feet		NO	1			
Aquitard present with > 50 feet cumulative thickness		NO	2			
	Total Hydrologic Score		4			
3. Potential Contaminant / Land Use - ZONE 1A			IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A		URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high		NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A		NO	NO	NO	NO	NO
	Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)		YES	2	2	2	2
(Score = # Sources X 2) 8 Points Maximum			4	4	4	4
Sources of Class II or III leacheable contaminants or		YES	2	2	2	
4 Points Maximum			2	2	2	
Zone 1B contains or intercepts a Group 1 Area		NO	0	0	0	0
Land use Zone 1B		Less Than 25% Agricultural Land	0	0	0	0
	Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	6	4
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present		YES	2	2	2	
Sources of Class II or III leacheable contaminants or		YES	1	1	1	
Land Use Zone II		Less than 25% Agricultural Land	0	0	0	
	Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present		YES	1	1	1	
Sources of Class II or III leacheable contaminants or		YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of		NO	0	0	0	
	Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score			13	13	13	6

4. Final Susceptibility Source Score	8	8	8	7
5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate